

Integrating Information and Communication Technology (ICT) in education: The potential challenges and benefits

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Abstract

The trend to use ICT in teaching and learning has become a standard in many educational institutions. Educators consider ICT a requirement and believe that education needs to catch up with technology development. This paper summarizes key messages of integrating Information and Communication Technology (ICT) in education. This paper discusses the potential challenges educational institutions face, particularly teachers when they intend to use technology in the teaching and learning process. The benefits of technology in education are also elaborated. ICT inclusion in education provides advantages not only to the teachers and students but also to the school. This paper provides some basic information for policymakers, education specialists, ICT practitioners and a broader audience interested in the need for technology in the education system.

Keywords: education; ICT integration: challenges and benefits

INTRODUCTION

Over the last decade, the enormous development of technology, which has extended to every sector, has encouraged education to use technology as a catalyst to increase the quality of teaching and learning. The use of particular technology, especially ICT, in teaching and learning has become popular. Many educators consider ICT a must since people now live in the 21st century, and almost all sectors, i.e. business, economy and government, are managed using ICT. This phenomenon is considered one characteristic of globalisation. Appadurai (1996) explains that boundaries and distances between places are now affected by the high speed of technological invasion, including information technology, in many sectors of life like business and the workforce. Therefore, the education sector is expected to keep up with this globalisation era.

The influences globalisation gives on the world, including education, cannot be avoided. Globalisation is not something that is created, but it is always happening and progressing. Lauder, Brown, Dillabough and Halsey (2006) state that in the global world where everything is moving so fast, nations compete to produce highly scientific knowledge and technologies that enable innovation. A highly skilled workforce who has knowledge, initiative and insight is the employment required by any employer. Here is the role of

education to produce such educated and skilled people. One way to successfully implement that plan is by integrating ICT into the education system so that the graduates of educational institutions will have met the criteria of skilled workers.

According to Okado (2007), ICT is a technology used to process information and spread information from one place to another, from one person to another, group of people or society. There are two types of ICT, traditional ICT such as newspaper, radio, television, film and music and new ICT such as computers and the Internet. The meaning of ICT in this article refers to the new one, the use of computers and the Internet in education. Hooper and Rieber (1995) divide technology into two: product and idea technologies. The examples of products are hardware and software, while the idea is an abstract plan of how the technology will be used. They emphasize that idea and product technologies should be united to achieve effective technology integration in education.

The concept of integrating ICT in education stands on the idea of using technology such as computers, the Internet, and laptop as well as software and applications to enhance teaching and learning and support educational purposes. In the end, it is expected that both teachers and students will experience the benefits of ICT for their teaching and learning process as well as for their future, especially for students who will face a world that might be completely different and for teachers to prepare the students facing their future with proper skills they need to survive. However, any possible constraints that might also occur should be anticipated.

LITERATURE REVIEW

The attempts to integrate ICT into education have been conducted by many researchers. They came up with the conclusion that ICT is a promising tool that plays an important part in supporting teaching and learning despite some possible challenges and problems, which might come along the process. However, some educators would agree that the impact of ICT development is not significant on the learning process or classroom organisation (Elliot, 2004). Some possible reasons are extracted from the literature to give a clear picture of why the impact is still limited.

According to Coppola (2005), teachers and schools tend to fall into 4 traps when they try to employ technology for instruction.

1. Cosmetic use means that when teachers are forced to use technology, and they do not know how they end up using computers just for being looked at, they do.
 2. The technological imperative, means that instructional technology becomes more fascinating than the teaching itself. Educators assume that since the technologies are available, they should be used in teaching.
 3. Third, romantic visions happen when leaders put too much hope in technology being able to do better; for example, people assume that computers can replace teachers, be more efficient than the teacher, increase class size, decrease cost and motivate students.
 4. The domination of politics happens when competition for getting more technologies dominates the educators' attention more than creating a thoughtful instructional design.
- When an educational institution trying to use technology falls into these traps, the impact of ICT will be inadequate since it has not been applied effectively and appropriately. For

example, in the budgeting process, institutions and educators tend to focus on providing the hardware, and then the software rather than focusing on the proper use of the technology and the type of learning supported by the technology (Newhouse 2002). Whereas, technology such as computers, the Internet, software and others are only the media; teachers still play the most important part in the teaching and learning process. The success of technology integration in education lies in the learning design prepared by teachers.

Hooper and Rieber (1995) also examine the reasons for the failed impact of technology in education. They illustrate a model of five stages to adopt technology in education. Teachers are supposed to follow these stages properly; otherwise, the potential use of the technology will have only a limited impact on education. The stages are illustrated in Figure 1.

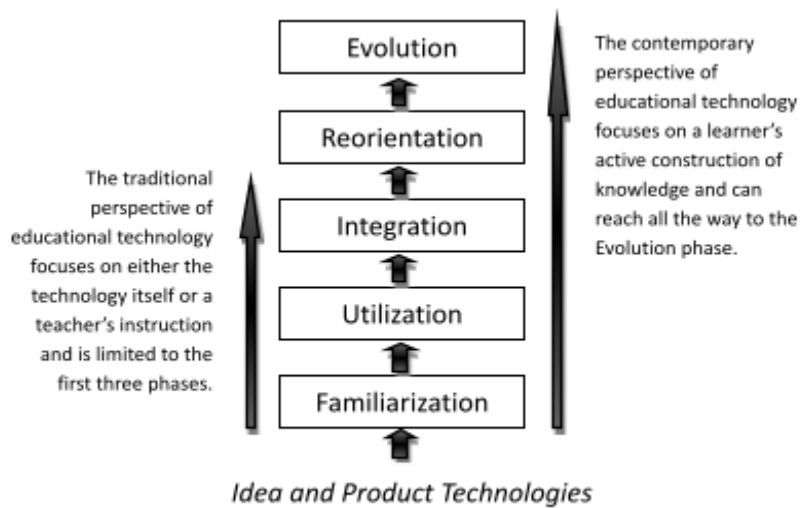


Figure 1. A model of adoption of both “idea and “product” technologies in education

The first stage, which is familiarization, happens when technology is first introduced to teachers through workshops or training. When the workshop ends, so does the teacher’s experience. This often happens in an attempt at instructional innovation. There are no further actions to support teachers in a real situation in class. The second stage, which is utilization, occurs when the teachers start to implement the knowledge they got from the workshop. However, at this stage, there is no commitment to use it frequently. As a result, the teacher is likely to stop whenever they experience problems. They go on by stating that the third stage, which is integration, happens when the teachers decide to commit to using technologies in their instructional design. However, this is only the beginning of understanding educational technology.

Hooper and Rieber (2005) insist that teachers should go to the next stage, which is reorientation. In this stage, teachers have realized that their role in learning is to design a learning environment in which students are supported and facilitated to construct and shape their learning. Technology is used to engage the students in the subject matter. The final stage is evolution, which happens when education keeps evolving and developing to meet the challenges and potentials that always change and develop.

Thus, it is clear that ICT development in education tends to have a limited impact since the teachers, schools, and other stakeholders often fall into the traps. Moreover, they have not followed the stages properly. For educational institutions to effectively and efficiently implement ICT, they must give their full commitment to ICT development in education.

METHOD

A literature review approach, which aims at describing knowledge, ideas and findings from academic publications in order to be able to make an illustrative analysis of a given topic, has been used for this article. The method of collecting the data is to gather and review a number of sources from the books, articles and journals that have been made public in national and international media. In order to explain and inform readers, the data are analyzed in a descriptive way by describing the major issue.

FINDINGS AND DISCUSSION

The challenges of ICT integration in education

In general, any challenges in applying ICT in education will fall into three aspects, which are student, teacher and school. However, Coppola (2004) states that according to her research, the best way to apply technology or computers in education is by helping teachers to learn about technology and support them. School leaders need to take into consideration the important role they have to support teachers, and it is expected that in the end, the teachers become self-motivated, self-directed and well-supported. Therefore, school plays an important role in successfully implementing ICT in education. However, schools or institutions will experience some major difficulties in attempting to use ICT to transform teaching and learning, and these difficulties can be addressed.

Coppola (2004) mentions the existence of resistant staff and teachers in the process of ICT development in schools. They do not see the point of using ICT in their teaching. However, it will not be a problem if the resistant teachers are excellent and well-respected ones. The concept of using technology is not that it should be used in every teaching and learning process. Technology is supposed to be used to address problems in teaching that cannot be addressed by using traditional methods. To address this problem, it is better for schools to start the process of transforming teaching and learn to work together with staff and teachers who are willing and trained. Professional development communities need to be established, so that, in the future, they can give understanding to the resistant teacher the importance of ICT inclusion in education.

The other difficulty is the teacher who had negative experiences with access and support. They tend to give up since they have only limited access to computers and are still struggling to apply technologies. While the school is more likely not to provide enough support for them (Coppola, 2004). Therefore, to address this problem, schools that commit to ICT development in their institution should support their teacher by providing sufficient support such as infrastructures like computers, software, and ICT training and consultation in a professional learning community's context. Dufour (2004) explains that a professional learning community is a group of people with an interest in education, such as teachers, school committee, high school department, school district, education department, and

national professional organisation. It would be much more helpful if teachers gain support from all communities.

The potential benefits of ICT in education

Despite all limitations and challenges in ICT implementation, most educators keep trying to incorporate ICT into education. It happens for some reasons, and they believe that the limited impact of technology in education happened not because of the technology itself. It happens because of the improper way of implementing ICT. They also believe that there are many potential benefits of ICT in education. Therefore, it is expected that through a proper approach and the benefits, there will be a chance for a successful ICT implementation.

Organization for Economic Co-operation and Development or OECD (2001) lists three main rationales for the importance of ICT inclusion in education. First, the economic aspect: they assert that workers with ICT skills are considered superior by 21st-century employers. Acquiring ICT skills is important for a future career. Second, the social aspect: Nowadays, ICT has the same position as literacy and numeracy so it becomes a requirement for social participation in community and workplace. The wider use of ICT will benefit education in a way that it might form a good relationship between home and school, a great parents' involvement in students' progress and interactive involvement of educational institutions in society. Third, the pedagogical aspect: ICT has essential roles in broadening and enriching teaching and learning.

One key point that needs to be taken into account to integrate technology or computers in education is that according to research conducted by Coppola (2004), by helping the teacher learn about technology and support them. How can we expect students to be skilful in ICT if the teachers themselves have not acquired the skill? Therefore, if we are keen on ICT development in our institution, we should support our teachers by providing sufficient support such as infrastructure like computers, software and proper and sustainable ICT training and consultation. It needs to take into account that in ICT consultation, the person who is skilful in ICT is needed to support teachers who face difficulties in attempting ICT in their class. This person acts as a helper and counsellor for the teachers, especially in technical work.

Newhouse (2002) states the reason educators should use technology to support learning comes from the feeling of dissatisfaction with the current learning style and striving to do better to solve educational problems and improve productivity. The appropriate use of ICT can support teachers in building a new learning style, which is constructivist learning, a learning theory that shifts away from the traditional teacher-centred teaching styles towards student-centric methods (InfoDev, 2005). This theory emphasizes that students try to construct knowledge from their prior knowledge and apply it to authentic contexts rather than just receiving and recalling information from teachers.

Technology can help students produce something authentic such as making products like podcasts using software like Audacity. In addition, technology also supports building communication between students, schools and parents and others conveniently and meaningfully via web pages and email (OECD, 2001). For example, students, who have inquiries about knowledge, can now communicate with the experts by just sending emails or looking for the answer on certain reliable web pages by being critically selective in extracting the information. The contemporary theory that supports this is connectivism. This theory emphasizes the use of technology and connection-making as learning activities

(Siemens 2005). Both constructions and connectivism are learning theories that should be considered to reform school practices as part of the 21st century.

Elliot (2004) states that there is some potential for digital technologies; they enrich the learning environment, engage students and enhance learning outcomes. In addition, students who experience difficulties, disempowerment, alienation or disengagement in traditional classroom learning will get assistance from the technologies. For example, inactive students who are shy in class to at least ask questions can be facilitated to express their feelings to their teacher through technologies such as email. With the latest development of technology, there are many other instant messaging applications that can be used to communicate other than email. Besides, students who have difficulties in writing exams can be assisted by asking them to do the exam orally by recording their answers rather than writing the answers. Teachers should take the different learning styles that are owned by their students into consideration by preparing different types of assessments. Moreover, students who have a disability such as hearing and dyslexia can be helped by using certain software. Therefore, the use of ICT will facilitate the teachers to do their already-overloaded jobs effectively and efficiently.

CONCLUSION

Given the fact that the use of technology would benefit the development of education despite the challenges that also might appear, the integration of ICT into the education system is essential. For years, educational institutions have tried implementing ICT, but the impact on the quality of teachers and students should have been more extensive. ICT implementation in education will provide more opportunities for teachers' professional development and for students to be prepared with skills that could help them survive in the globalisation era.

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